Navy Lists Key Research Plans

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Washington, March 6 — Vice Adm. W. F. Raborn, the Deputy Chief of Naval Operations for research and development, today unrolled, necessarily to a limited extent, a long list of projects upon which the Navy is far advanced.

They reach into all areas of naval activity—on, under and over the sea, increasing the range of precision or lethality or reliability of naval weapons and countering the enemy's.

Some are predicted for the 1970 decade, some for the next three or four years, a few for use in the fleet in 1964. Raborn gave his testimony to the Senate Armed Services Committee.

Anti-Sub Projects Key

Several of the outstanding prospects are, as expected, in the field of anti-submarine warfare, the Navy's most acute concern, notably these:

1. Airborne equipment for the detection of enemy subs, by which numerous systems may be so integrated as to simplify and concentrate the detecting powers of all in a single instrument. This would reduce the number of operators as well as of instruments and markedly cut down both weight and volume, to the plane's great advantage.

2. A new generation of radar and of the dipped-sonar equipment—this equipment let down into the sea to much greater depth than at present, thereby passing under thermal layers of water, which today defeat sonar detection of enemy subs.

3. A wholly new sonar for ship mounting, with twice the range of current equipment, permitting a reaching out to the greater range that will be necessary to cope with enemy weapons as good as America's own.

Sea Bottom Used

This makes use of sonar waves bounced off the sea bottom, also of a cautiously mentioned "convergence-zone" technique, whereby a stronger, clearer three-dimensional signal is brought in and analyzed automatically and instantly, instead of laboriously by human computation.

4. A naval adaptation of the experimental "regenerative" turboprop engine—using heat from the exhaust gases to preheat the air before combustion.

Its prime virtue for anti-submarine warfare planes is that it reduces fuel consumption, hence permits much longer operation of a search plane.

5. Of general use will be a long-range navigation radar, weighing 8 pounds instead of the 100 of today's radar, with bulk of half a cubic foot instead of 2.3 cubic feet, and with a six-fold increase in reliability. It will be used in light aircraft.

The Polaris-submarine system itself represented so spectacular an advance in undersea warfare that the public has not had time to think of anything better. But new gains are freely predicted—not alone in the betterment of the missile itself, but in the whole system.

These advancing concepts Admiral Raborn referred to as "following or complementary to the Polaris system."

They apparently include additional and varied types of undersea platforms for launching missiles of the Polaris pattern. What can be done ingeniously in that area can be surmised; the Navy's problem is to determine, as well, what is truly desirable from the viewpoint of naval strategy and tactics.

New forms of propulsion (of the missile, not the nuclear sub itself) are considered, such as the use of the Ramjet, employing chemical or other fuels.

The new ideas in missiles include a rapidly developing field of counter-measures (to defeat enemy missiles) and of counter-counter-measures as well. One major aspect of the new Typhon project is its ability to pierce enemy jamming devices to a far greater depth than anything now in existence.

It would appear that this same power is contemplated for the missile (a Navy responsibility) that will arm the new and much-talked of TFX plane (this aircraft is now under development by the Air Force). It also would appear that if the principle works with a surface-to-air system, it will work with air-to-surface missiles, a most significant capability that [illegible] achievement.

Of all the many roles of electronic principles and practice in the new warfare, this ability to "jam" enemy instruments, or to overcome the enemy's jamming devices, must be recognized as a major item.

For if America's own advanced jamming techniques will confuse the guidance and command powers of an enemy intercontinental ballistic missile, this is as useful as shooting down the ICBM. Conversely, America's own ability to conquer an enemy's jamming device would be of such enormous value as to justify fully the huge effort the Raborn organization is putting into this task.

There are many related enterprises. One of the little-known missiles, Shrike, due next year, is specifically designed for homing on an enemy radar installation—not only jamming it but also putting it out of business.

Automation Stressed

Another project studies an extension of the principle of non-reflective coating for the upper surface of submarines; Germany developed it in World War II (it is a paint that diffuses radar signals) but its value seemingly was greatly reduced when the non-emerging atomic sub came along; the new study may disclose new applications.

A group of projects of profound interest involves the much greater use of integrated automation [illegible] will do the present work of several.